SYSTEM AND METHOD FOR IDENTIFYING CONTENT SERVICE WITHIN CONTENT SERVER

BACKGROUND OF THE INVENTION

The present invention relates to wireless network service mediation services. More specifically, the invention relates to a system and method for identifying content services.

It is becoming increasingly common for content to be provided to mobile terminals operating in wireless communication systems, for the purpose of providing mobile terminal users with up-to-date information. Network operators are currently providing information services relating to stock prices, sports, news updates, and the like. Initially, network operators provided such information services by using specific messaging services such as the Short Message Service (SMS). More recently, mobile communication systems have begun to support mobile access to the Internet.

Various communication protocols, including the Wireless Application Protocol (WAP), have been developed to provide mobile access to the Internet. When utilizing WAP protocol for communication, a mobile terminal communicates with a gateway by means of WAP, and the gateway communicates with content servers via HTTP to obtain content in the form of Wireless Mark-up Language (WML).

Proxy servers are traditionally used for intermediating between mobile devices and Internet network service applications and for securing the communication thereof. In more advanced systems, the proxy servers are

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used for improving the navigation and content delivery from the network application and for providing enhanced control and monitoring over these services by implementing for example caching and error detection techniques, access control, billing and reporting, etc.

5   The management and control of content servers and services requires the ability to identify the various content services residing on a server for various purposes such as tracking usage of a specific service; differentiated billing based on user-applications rather than host or domain; personalization, selective content adaptation and branding tailored for a specific application or
10   surfing area, access control and caching, etc.

        According to prior art methodologies the content identification of content services and applications are based on identifying the respective URL addresses of the specific content service. The URL is typically identified by a prefix (e.g. http://www.somesite.com/news/* could identify the sports section
15   of a web-site). This method has serious shortcomings given that web services today frequently utilize dynamic URL's that are mechanically produced. Such automatic URL's frequently provide no hint as to the specific application being used (e.g. http://www.somesite.com/ad6eb37433a9083ac?uid=452372 may identify any content service within the somesite.com website), hence
20   differentiation between different services residing on the same host is frequently impossible. Furthermore with URL-based identification methodology, whenever the URL address structure is changed or the hosting location of the service is changed, the proxy server cannot find the correlation between old and new URL representations. Also, if the proxy contains

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configurations that identify the service e.g. by URL or URL prefix, these configurations may not be sufficient for identifying the service or specific sections within the service, as the URL may have no unique pattern which identifies it. For this reason, this methodology is not suitable for content providers implementing dynamic URL techniques. The dynamic URL consists of changing code numbers, that only the content provider itself can identify in real-time, hence it is impossible for proxy servers to relate the dynamic URL codes (when visited by the client) to the specific content or service.

For example, suppose a proxy server with access control utilities aimed at restricting mobile users' access to specific content information or services according to predetermined rules. These rules may relate to security restrictions, payment requirements or any customized restrictions (such as age restriction to sex-related content). Such proxy would require a robust, configurable and maintainable method for identifying the various applications within the mobile content sites.

It is a main object of the invention to avoid the limitation of prior art proxy servers and enable content services identification for content providers that utilize dynamic URL techniques or that require robust tracking of services across changing URL representations.

SUMMARY OF THE INVENTION

The present invention provides a new method for identifying current content service visited by a mobile device user within a content server through a cellular network, said method comprising the steps of: Parsing

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the received content from the content provider server for identifying

embedded hyperlinks and respective link titles, analyzing user requests for

identifying chosen hyperlinks of previous received content and recording

thereof and identifying mobile device location within content server site

5   according to the sequence of at least two successive hyperlinks titles;

BRIEF DESCRIPTION OF THE DRAWINGS

These and further features and advantages of the invention will become

more clearly understood in light of the ensuing description of a few preferred

10   embodiments thereof, given by way of example only, with reference to the

accompanying drawings, wherein-

Fig. 1 is a general diagrammatic representation of the environment in

which the present invention is practiced;

Fig. 2 is a block diagram of the proxy server modules according to the

15   present invention;

Fig. 3 is a flow-chart representing the process of identifying content

service by tracking user navigation track according to the present invention;

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 illustrates one possible network configuration, in which the present invention can be implemented.

Referring to Fig. 1 of the drawings, it will be seen that a mobile telephone device (A) is connected through a cellular network (B) to the designated server (C) (hereinafter called "the smart proxy server"). The smart proxy server functions as an intermediary gateway between the user mobile device and the Internet content providers (D) (hereinafter called "content servers"), which contain data available for user access.

According to the present invention it is suggested to design supplementary proxy server modules for analyzing and managing user requests, thus providing users with integrative and efficient services. The proxy supplementary modules (smart proxy server) essentially take an active part in mobile devices sessions with various content and information service providers.

Fig. 2 illustrates a block diagram of the smart proxy server modules; the supplementary module of the proxy server includes a request analysis module (201) for identifying request type and destination and recording user surfing track; a content analysis module (202) for parsing the content received from the service provider and identifying the hyperlinks' titles; and a service management module (203) for identifying content services identity according to tracked hyperlink path.

The smart proxy server further includes a conventional proxy module. This module includes an access management module (205), cache management module (206) and session management module (207).

Such enhanced proxy servers enable different utilities, which provide
5   efficient content services and other advanced services to the mobile users.

One of the preferred utilities of the smart proxy concerns the proxy server's ability to provide identification of content services even when the URL addresses are dynamic as opposed to prior art proxy servers which are only able to provide such services where the URLs are permanent addresses. As
10   illustrated in Fig. 4, it is suggested to use the proxy server content analysis module for parsing the markup content and identifying embedded hyperlinks and respective titles. The proxy server tracks user surfing course by recording user's hyperlink selection in the short-term memory of the proxy. Thus, the proxy server can identify the current location of the mobile user within the
15   content provider site on the basis of mobile users' recent navigation track. For example, if the proxy server is required to restrict unauthorized users from accessing a pornographic content page, the server checks user recorded navigation track of hyperlink titles, (e.g. Yahoo --> Society --> relationship --> pornography) and compares this titles' sequence to pre-defined sequence of
20   titles that were defined by the proxy operator. If the sequence of hyperlink titles of the user surfing-track is similar (or equivalent) to one of the predefined sequences, indicating unauthorized access, the proxy server rejects user last request. This capability of identifying user content/service location within content provider site can be utilized for any service of the proxy server which

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is associated with the content server processing, such as the mediating services between the content server and back-end services. Analyzing user context enables activation of such back-end services based on user-surfing context. For example if the user selected a menu category which requires payment, the proxy server can identify this user's request as a billable request and report the transaction to the necessary back-end server for the user to be billed.

An example of an additional embodiment of the proposed method could be for the proxy element to register the hyperlink titles denoting the users' surfing-path in persistent storage for future analysis, and for an offline process to analyze the hyperlink-title sequences through which the user has visited and to perform various processes accordingly. E.g. such method could be used for producing usage-reports of content services or for producing offline billing records for viewed content.

The service of identification and storage of hyperlink title paths can be further utilized for displaying the sequence of visited hyperlinks, thus enabling users to identify and return to previously visited (hyperlinks) services.

In order for mobile devices to properly display requested content, such content requires processing that is tailored to the different mobile devices' specification. The content processing differs for each content service. Hence, it is suggested to use the service identification capability

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for selecting the proper content processing and enhancements to be performed on the markup content before delivery to the mobile device.

5   The service identification can also be of use to the relevant service provider, who can track users' activities for billing purposes.

Although described herein as a proxy-server functionality, the described service identification module functionality can be implemented in part or in whole within the user agent device. The implementations and utilizations of the technology remain similar, while the tracking and recording of hyperlink
10   title paths is performed on the client instead of on a network proxy server.

While the above description contains many specificities, these should not be construed as limitations on the scope of the invention, but rather as exemplifications of the preferred embodiments. Those skilled in the art will
15   envision other possible variations that are within its scope. Accordingly, the scope of the invention should be determined not by the embodiments illustrated, but by the appended claims and their legal equivalents.